

**AMENDED CLAIMS**

[received by the International Bureau on 18 March 2005 (18.03.2005);  
original claims 1-12 replaced by new claims 1-11 (2 pages)]

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1. Method of manufacturing a resonator within a semiconductor device, said semiconductor device comprising a substrate (Z\_HO) with a first (XX') and a second (YY') axes which are perpendicular, wherein said method comprises the steps of :

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- etching a hole (TR) in the substrate (Z\_HO)
- creating a first doping zone (Z\_DIFF1) inside and around the hole (TR) for defining a first electrode,

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- partitioning said first electrode into two electrodes (ELEC1, ELEC2),
- applying a delimited oxide deposit (Z\_OXI) inside and around the hole (TR) according to a specific deposit pattern (M\_ONO),
- defining a second doping zone (Z\_DIFF2) fully covering the hole (TR),
- removing the oxide deposit (Z\_OXI) in order to define an element forming the resonator capable of vibrating between the two electrodes (ELEC1, ELEC2), wherein the partition of the two electrodes (ELEC1, ELEC2) is obtained by implanting a first dopant through a partitioning pattern (M\_ARBOR).

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2. Method of manufacturing a resonator within a semiconductor device as claimed in claim 1, wherein the implant (AR) partly covers the hole (TR) at its bottom and sides as well as the substrate surface adjoining said hole (TR).

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3. Method of manufacturing a resonator within a semiconductor device as claimed in claim 1, wherein the first dopant is Argon or Boron.

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4. Method of manufacturing a resonator within a semiconductor device as claimed in claim 1, wherein said hole (TR) is a trench or a pore which is substantially perpendicular to the substrate surface (Z\_HO).

5. Method of manufacturing a resonator within a semiconductor device as claimed in claim 1, wherein the substrate (Z\_HO) is of a high-ohmic type and the first doping zone (Z\_DIFF1) is of a low-ohmic type.

6. Method of manufacturing a resonator within a semiconductor device as claimed in claim 1, wherein the specific deposit pattern (M\_ONO) extends along the second axis (YY'), the inside of said deposit pattern (M\_ONO) allowing the oxide to be settled  
5 inside the entire hole (TR) and at the substrate surface adjoining said hole (TR) and beyond.

7. Method of manufacturing a resonator within a semiconductor device as claimed in claim 1, wherein the second doping zone (Z\_DIFF2) is obtained by means of a second doping pattern (M\_PS) extending along the first axis (XX') of the semiconductor (SI),  
10 the inside of said pattern (M\_PS) allowing a second dopant to be settled totally inside the hole (TR).

8. Method of manufacturing a resonator within a semiconductor device as claimed in claim 7, wherein the inside of said pattern (M\_PS) permits a second dopant to  
15 cover totally the oxide deposit adjoining the hole (TR) and beyond.

9. Method of manufacturing a resonator within a semiconductor device as claimed in claim 1, wherein said method comprises a further step of adding first pads (CTA) along the second axis (YY') on each side of the hole (TR), said pads being in contact with the  
20 first doping zone (Z\_DIFF1).

10. Method of manufacturing a resonator within a semiconductor device as claimed in claim 1, wherein said method comprises a further step of adding second pads (CTA) along the first axis (XX') on each side of the hole (TR), said pads being in contact  
25 with the second doping zone (Z\_DIFF2).

11. Method of manufacturing a resonator within a semiconductor device as claimed in claim 1, wherein said semiconductor device comprises a substrate (Z\_HO) with a first definition zone (Z\_HL) where the resonator is built.  
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